Trend Study 10-2-00

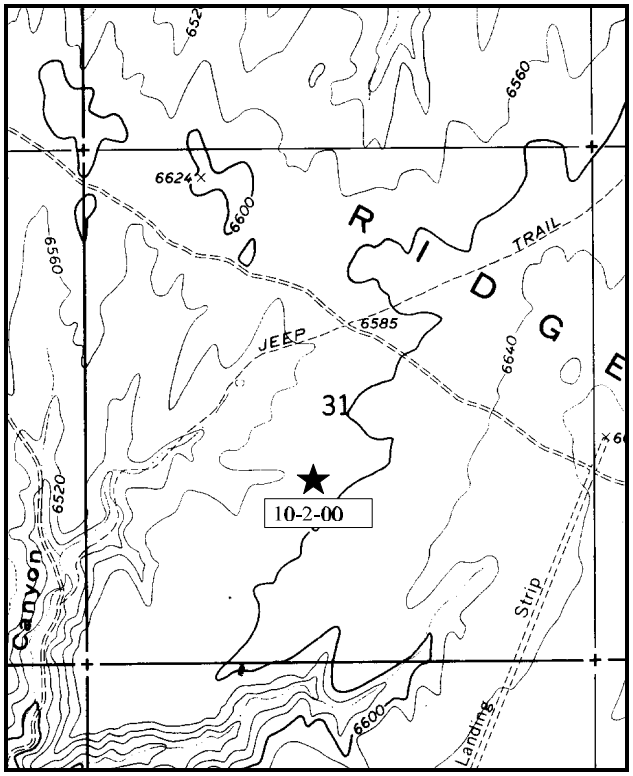
Study site name: Lower McCook Ridge Exclosure . Range type: Desert Shrub .

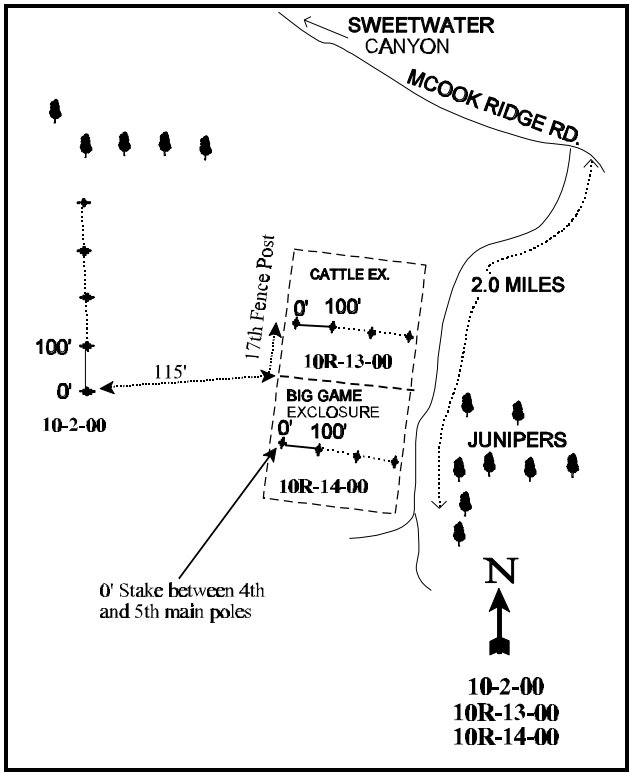
Compass bearing: frequency baseline 345°M .

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Indian Ridge road, turn southeast and proceed up McCook Ridge approximately 2 miles. A large exclosure can be seen off the south side of the road. From the northwest side of the deer fence on the lower McCook Ridge Exclosure, the 0-foot baseline stake is approximately 40 paces away bearing 263°M. The frequency baseline is marked by green fenceposts, 12-18 inches tall.





Map Name: Cooper Canyon . Diagrammatic Sketch

Township 13S , Range 24E , Section 31 UTM. 4389198 N, 647916 E

DISCUSSION

Trend Study No. 10-2 (16A-2)

The Lower McCook Ridge Exclosure study is found outside of the exclosure complex on Lower McCook Ridge. The exclosure was constructed in 1964. In addition to the regular rotation, this site was re-read in 1997 as a special studies site to monitor perceived conflicts over elk and livestock use in the North Book Cliffs. The site is on a broad swale that slopes gently to the southwest at an elevation of 6,600 feet. Vegetative composition is dominated by a mixed stand of basin big sagebrush, fourwing saltbush, winterfat, and fringed sagebrush. This is thought to be an important wintering area for elk and mule deer. Pellet group data from 2000 indicate light use by wildlife with an estimated 27 deer days use/acre (67 ddu/ha) and 27 elk days use/acre (67 edu/ha). In 2000, no cattle pats from the current year were sampled. Cattle use (800 AUM'S) in this area is on a rotational deferred system between fall and spring, allowing some periods of rest. Early spring use is utilized to help control cheatgrass.

The soil is light brown in color, alluvially deposited, and has a loam texture. Soils are slightly alkaline (pH of 7.6) and have an average temperature of 61°F at over 17 inches in depth. Phosphorus is low (5.5 ppm) where 10 ppm is thought necessary for normal plant development and growth. The effective rooting depth averages 18 inches overall, but varies over the length of the transect. Effective rooting depth is 26 inches at the beginning of the transect decreasing to 12 inches at the end of the transect. Contradictory to conventional thought, a higher density of basin big sagebrush exists where the soils are more shallow, and more cheatgrass where the soils are deeper. There is a small wash that runs through the end of the baseline and plant pedestaling is associated with the area. Originally in 1982, there were extensive areas of exposed bare ground (49%), some ephemeral litter (i.e., mostly dead cheatgrass), and minimal basal vegetative cover. Vegetation and litter cover decreased between 1995 and 1997, but increased between 1997 and 2000. Bare ground has slightly increased in relative percent cover over the last 3 readings.

Several key browse species exist on the site including: basin big sagebrush, winterfat, fringed sagebrush, and fourwing saltbush. Currently, basin big sagebrush accounts for half of the browse cover with a density of 3,980 plants/acre. This is likely a hybrid between basin big sagebrush (*Artemisia tridentata tridentata)* and Wyoming big sagebrush (*A. tridentata wyomingensis*), but they were all classified as basin big sagebrush. Population density has increased since 1997 due to recruitment of young plants. The young age class made up 14% (420 plants/acre) of the population in 1997, increasing to 32% (1,260 plants/acre) in 2000. Percent decadency has increased over the last 3 sampling periods. In 1995, 11% of the population was classified as decadent, increasing to 20% in 1997 and 26% in 2000. Vigor has generally been good, with 9% of the population displaying poor vigor in 2000. Use on basin big sagebrush has generally been moderate to heavy on over half of the population from 1988 to 1997. However, moderate and heavy use decreased to 39% in 2000. Biotic potential (# of seedlings) has declined from a high of 45% in 1995, to only 5% in 1997 and 1% in 2000. However, the increase in young plants in 2000 still points to an increasing population. Although 35% of the decadent plants were classified as dying in 2000 (360 plants/acre), recruitment from young plants (1,260 plants/acre) is currently adequate to replace any of these plants that may die-off.

Fourwing saltbush, while noticeably less numerous, produces good quality forage. The population is currently estimated at 700 plants/acre and provides 11% of the browse cover. Use on fourwing saltbush has been light to moderate over all sampling periods with exception of 1995 in which half of the plants displayed moderate or heavy use. Currently, 29% of the population shows moderate use, and 3% heavy use. Seventeen percent of the population was classified as having poor vigor in 1997, with no plants classified as such in 2000. Percent decadency slightly decreased from 42% in 1997 to 40% in 2000, both of estimates much higher than the 13% estimated in 1995. Currently, recruitment and biotic potential are zero.

Winterfat on this site is a low growing browse averaging only 8 inches in height. Density estimates in 1982 and 1988 were comparable at around 3,500 plants/acre. Population estimates increased beginning in 1995 due to the larger sampling area instituted in 1992 which provides better population estimates for species having clumped and/or discontinuous distributions. Data from 1995 indicated a much larger population of 10,420 plants/acre. Currently, the population is estimated at 7,020 plants/acre. Utilization in 1995 was difficult to determine due to the abundant annual growth associated with the unusually wet spring. About 42% of the plants were classified as moderately hedged in 1997, with the rest being classified as lightly hedged. Currently, 43% of the population displays moderate use with an additional 21% of the population showing heavy use. Vigor is generally good, although percent decadency increased from 0% in 1995 and 1997, to 10% in 2000. Biotic potential (number of seedlings) and recruitment (number of young plants) are currently low at 1% and 3% respectively. Increased decadency, low recruitment, and biotic potential can be attributed in part to the drought experienced in 2000.

Other browse species encountered on the site include fringed sagebrush, broom snakeweed, and prickly pear cactus. Fringed sagebrush currently contributes 27% of the browse cover, with the population estimated at 9,800 plants/acre. Use is mostly light and vigor good. This population looks to be expanding with a biotic potential (number of seedlings) of 82%.

Perennial grasses are deficient and consist mostly of Sandberg bluegrass, bottlebrush squirreltail, and Indian ricegrass. All grasses had 30% to 60% of their current growth removed during the 1988 reading. Sandberg bluegrass has remained at a nearly constant frequency since 1995. It currently (‘00) has a quadrat frequency of 47, a nested frequency of 118, and provides the most cover of any grass (just over 4%). Bottlebrush squirreltail significantly increased in nested frequency in 2000. There was no noticeable utilization on perennial species when the site was read in June 2000. Cheatgrass brome is also abundant. It accounted for 57% of the herbaceous cover in 1997, decreasing to 28% in 2000 due to the dry conditions.

If annual species are disregarded, forbs are less common than grasses. Scarlet globemallow is the most common forb, currently sampled in 47% of the quadrats. This species contributes just over 2% average cover.

1982 APPARENT TREND ASSESSMENT

Soil trend appears to be stable to declining. To a large degree, the soil surface is barren of vegetation or effective litter cover. Vegetation trend is perhaps slightly more stable but still declining. With the exception of fourwing saltbush, the shrub populations appear to be expanding with mostly light use. Perhaps the most serious concern is an apparent rapid increase of broom snakeweed. Perennial herbs are nearly absent from the site and show no evidence of increasing.

1988 TREND ASSESSMENT

Changes on the Lower McCook Ridge Exclosure study since establishment in 1982 include an increase in both sagebrush density and use. Density of big sagebrush has increased from 3,966 plants/acre to 5,865 plants/acre. A majority of the big sagebrush have a moderately hedged growth form, with 14% appearing heavily hedged. Other browse are only lightly used. In 1988, 30% of the big sagebrush were classified as decadent, as opposed to 6% in 1982. Still, there is an adequate number of young shrubs in the population. There are differences and difficulties in the identification of big sagebrush on this site. The 1982 study reported Wyoming big sagebrush on the base line. The sagebrush was all called basin big sagebrush in 1988. There is a great deal of hybridization between these two subspecies on this site. A few more young fourwing saltbush were found in 1988, but populations of saltbush and winterfat are basically unchanged. Fringed sagebrush has increased as predicted, along with the snakeweed, which is currently the most abundant woody species. The density estimate for snakeweed was 6,766 plants/acre in 1988, while there were only 2,999 plants/acre in 1982. With a large

number of seedlings, snakeweed continues to increase. Although cheatgrass still provides much of the ground cover, Sandberg bluegrass has increased in frequency. There continues to be a low diversity of forbs. Ground cover, in the form of mostly litter, has increased slightly. Total protective ground cover in 1988 was 64%, as opposed to 51% in 1982. Vegetative basal cover was low at 2.5%, due to a lack of understory herbaceous vegetation. Still, there was little evidence of erosion problems due to the level terrain.

TREND ASSESSMENT
soil - slightly improved (4)
browse - up for key species (5)
herbaceous understory - improved but with a very poor composition of annuals (4)

1995 TREND ASSESSMENT

The soil trend has improved slightly due to increased protective ground cover provided by herbaceous vegetation, litter, and cryptogamic crusts. Bare ground cover declined in 1995 as well. Browse trend is stable. Winterfat is abundant and lightly utilized. Fourwing saltbush is more heavily utilized but appears to have a stable mature population. Basin big sagebrush has declined in density from 5,865 plants/acre in 1988 to 3,860 plants/acre in 1995, but this is almost what it was originally in 1982. It should be noted that the sample size was greatly enlarged in 1995, giving much better population estimates for browse species. Therefore, the decrease is more from a better population estimate than actual losses, as few dead plants are present to explain this decline. Percent decadence has decreased from 30% to 11%. The density of broom snakeweed has shown a 53% decrease since the 1988 reading as well. Due to the drought, this trend is consistent throughout most of the state. The herbaceous understory is in poor condition, produces little forage and is dominated by annual cheatgrass. Sandberg bluegrass is the most numerous perennial species. Forbs are not an important aspect of this site due to low frequencies, but they have shown increased sum of nested and quadrat frequency values on each successive reading. The most common forb is still scarlet globemallow. Overall, the herbaceous trend is slightly up due to increased nested and quadrat frequency values of perennials, but it is still in very poor condition because of its weedy composition.

TREND ASSESSMENT
soil - slightly improved (4)
browse - stable for key species (3)
herbaceous understory - improved but in very poor condition due to the dominance of annuals (4)

1997 TREND ASSESSMENT

Rock and pavement cover have increased since 1995 to nearly 19%. This is likely a result of the decrease in litter and vegetation cover due to extended drought. Percent bare ground has stayed nearly the same at 25%. Erosion on the site does not appear to be increasing at this time and the soil trend appears stable. Winterfat shows higher utilization in 1997 compared to 1995. The plants show good vigor with no decadent or dead plants reported. Fourwing saltbush vigor has declined and decadency rate has increased. The basin big sagebrush population has shifted to a more mature age structure with more decadent and dead plants reported. Basin big sagebrush contributes 60% of the total browse cover. Broom snakeweed density has decreased by nearly 50% with a mostly mature age structure. The browse trend appears to be slightly down with the consideration of extended drought. Herbaceous understory has changed very little since 1995. Nested and quadrat frequencies have remained nearly the same. The herbaceous understory trend is stable, and as reported in 1995, still in very poor condition.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is stable. Since 1997, cover of vegetation and litter have increased. The ratio of protective ground cover (vegetation, litter, and cryptogams) to bare soil decreased, but remains high enough not to warrant a downward trend. Erosion is currently minimal. Trend for browse is stable. Basin big sagebrush, which makes up half of the browse cover, shows increases in density and recruitment as well as decreased use. Percent decadency, the proportion of decadent plants classified as dying, and plants displaying poor vigor all increased in 2000. However, these parameters are likely caused, at least in part, to drought and should improve with normal precipitation. Fourwing saltbush shows improved vigor from the 1997 reading, and a slight decrease in decadency. Winterfat shows increases in use and decadency, but this species only contributes 9% of the browse cover. Trend for the herbaceous understory is slightly improving. Even with drought, sum of nested frequency for perennial species increased significantly since 1997. Also, cheatgrass decreased in nested and quadrat frequencies in 2000 due to the lack of moisture in the fall, winter, and spring. Composition is still weedy in nature, but perennials appear to be stable to increasing.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - slightly improving (4)

HERBACEOUS TRENDS --
Herd unit 10 , Study no: 2

Type	Species	Nested Frequency				Quadrat Frequency					Average Cover %		
		'88	'95	'97	'00	'82	'88	'95	'97	'00	'95	'97	'00
G	Agropyron dasystachyum	-	-	-	4	-	-	-	-	1	-	-	.38
G	Bromus tectorum (a)	-	$_{c}$288	$_{b}$263	$_{a}$171	-	-	85	77	58	15.91	5.44	4.17
G	Festuca ovina	4	-	-	1	2	2	-	-	1	-	-	.00
G	Oryzopsis hymenoides	1	7	15	10	-	1	4	5	4	.24	.22	.62
G	Poa secunda	$_{a}$30	$_{b}$106	$_{b}$120	$_{b}$118	1	13	38	43	47	2.04	1.35	4.42
G	Sitanion hystrix	$_{a}$17	$_{b}$52	$_{ab}$42	$_{c}$114	2	8	23	19	47	.50	.70	2.50
Total for Annual Grasses		0	288	263	171	0	0	85	77	58	15.91	5.44	4.17
Total for Perennial Grasses		52	165	177	247	5	24	65	67	100	2.79	2.29	7.93
Total for Grasses		52	453	440	418	5	24	150	144	158	18.71	7.73	12.11
F	Allium spp.	-	2	-	2	-	-	1	-	1	.00	-	.00
F	Carduus nutans (a)	-	2	-	-	-	-	1	-	-	.00	-	-
F	Delphinium bicolor	-	2	2	-	-	-	1	1	-	.00	.00	-
F	Descurainia pinnata (a)	-	$_{b}$32	$_{a}$13	$_{a}$-	-	-	14	7	-	.29	.08	.00

Type	Species	Nested Frequency				Quadrat Frequency					Average Cover %		
		'88	'95	'97	'00	'82	'88	'95	'97	'00	'95	'97	'00
F	Draba spp. (a)	-	$_{b}$11	$_{a}$-	$_{a}$-	-	-	5	-	-	.02	-	-
F	Erigeron flagellaris	-	1	-	-	-	-	1	-	-	.01	-	-
F	Erigeron pumilus	32	40	42	33	-	16	22	20	18	.25	.40	.29
F	Lappula occidentalis (a)	-	$_{b}$55	$_{ab}$38	$_{a}$21	-	-	25	16	10	.27	.29	.20
F	Machaeranthera spp.	-	-	-	-	5	-	-	-	-	-	-	-
F	Penstemon spp.	-	-	2	-	-	-	-	1	-	-	.03	-
F	Schoencrambe linifolia	$_{a}$-	$_{b}$25	$_{a}$2	$_{a}$-	-	-	10	1	-	.05	.00	-
F	Sisymbrium altissimum (a)	-	$_{b}$6	$_{a}$-	$_{a}$-	-	-	4	-	-	.07	-	-
F	Sphaeralcea coccinea	98	100	105	119	-	39	40	44	47	.75	.95	2.24
F	Tragopogon dubius	$_{a}$-	$_{a}$2	$_{a}$-	$_{b}$21	-	-	2	-	10	.01	-	.18
Total for Annual Forbs		0	106	51	21	0	0	49	23	10	0.67	0.38	0.20
Total for Perennial Forbs		130	172	153	175	5	55	77	67	76	1.08	1.39	2.71
Total for Forbs		130	278	204	196	5	55	126	90	86	1.75	1.77	2.92

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 10 , Study no: 2

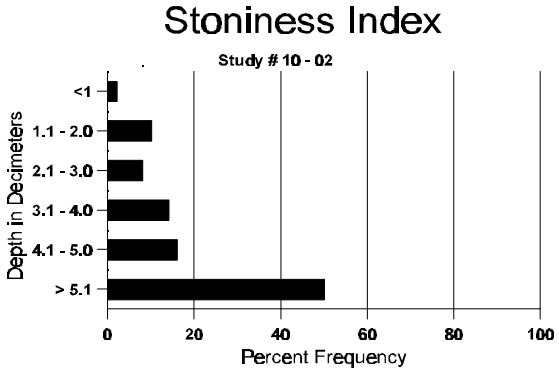
Type	Species	Strip Frequency			Average Cover %		
		'95	'97	'00	'95	'97	'00
B	Artemisia frigida	69	53	70	3.04	2.94	6.44
B	Artemisia tridentata tridentata	56	57	58	10.39	9.15	12.00
B	Atriplex canescens	26	10	24	1.99	.73	2.55
B	Ceratoides lanata	71	62	61	4.31	2.08	2.20
B	Gutierrezia sarothrae	39	31	40	1.41	.38	.95
B	Opuntia spp.	3	0	4	.18	-	.03
Total for Browse		264	213	257	21.34	15.30	24.19

BASIC COVER --
Herd unit 10 , Study no: 2

Cover Type	Nested Frequency			Average Cover %				
	'95	'97	'00	'82	'88	'95	'97	'00
Vegetation	356	351	331	2.30	2.50	41.63	23.80	39.90
Rock	177	117	41	0	0	1.49	.56	.21
Pavement	259	327	232	0	0	3.29	18.23	3.52
Litter	391	389	356	48.5	60.75	40.01	25.04	38.48
Cryptogams	143	246	81	0	.50	3.93	4.90	3.13
Bare Ground	292	301	301	49.25	36.25	26.30	25.04	35.13

SOIL ANALYSIS DATA --
Herd Unit 10, Study no: 02

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
18.4	61 (17.5)	7.6	35.0	38.8	26.2	1.9	5.46	185.6	0.51



PELLET GROUP FREQUENCY --
Herd unit 10 , Study no: 2

Type	Quadrat Frequency		
	'95	'97	'00
Rabbit	11	3	15
Elk	18	26	24
Deer	17	21	18
Cattle	-	1	-

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'97	'00	'97	'00
9	148	N/A	N/A
661	357	51 (126)	28 (68)
496	348	38 (94)	27 (67)
139	-	12 (29)	-

BROWSE CHARACTERISTICS --
Herd unit 10 , Study no: 2

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia frigida																		
S	82	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	233			7
	95	126	-	-	-	-	-	-	-	-	126	-	-	-	2520			126
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	402	-	-	-	-	-	-	-	-	402	-	-	-	8040			402
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	7	-	-	-	-	-	-	-	-	7	-	-	-	233			7
	95	140	-	-	12	-	-	-	-	-	152	-	-	-	3040			152
	97	44	-	-	10	-	-	-	-	-	54	-	-	-	1080			54
	00	49	-	-	-	-	-	1	-	-	50	-	-	-	1000			50
M	82	9	-	-	-	-	-	-	-	-	9	-	-	-	300	7	3	9
	88	23	-	-	4	-	-	2	-	-	29	-	-	-	966	7	5	29
	95	321	4	4	3	-	-	-	-	-	332	-	-	-	6640	12	10	332
	97	340	-	-	1	-	-	-	-	-	341	-	-	-	6820	10	8	341
	00	319	75	27	2	2	-	3	-	-	425	3	-	-	8560	4	7	428
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	4	4	-	-	2	-	-	-	10	-	-	2	240			12
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'82	00%	00%	00%	+75%
'88	00%	00%	00%	+88%
'95	.82%	.82%	00%	-18%
'97	00%	00%	00%	+19%
'00	17%	07%	.40%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
	'82	300	0%
	'88	1199	0%
	'95	9680	0%
	'97	7900	0%
	'00	9800	2%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata tridentata																		
S	82	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	88	45	-	-	8	-	-	-	-	-	53	-	-	-	1766			53
	95	86	-	-	-	-	-	-	-	-	86	-	-	-	1720			86
	97	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	18	-	-	-	-	-	-	-	-	18	-	-	-	600			18
	88	40	28	8	1	-	-	-	-	-	77	-	-	-	2566			77
	95	44	1	-	15	-	-	-	-	-	60	-	-	-	1200			60
	97	18	1	-	2	-	-	-	-	-	21	-	-	-	420			21
	00	30	3	-	-	-	-	30	-	-	63	-	-	-	1260			63
M	82	94	-	-	-	-	-	-	-	-	94	-	-	-	3133	24	33	94
	88	13	26	7	-	-	-	-	-	-	45	1	-	-	1533	24	30	46
	95	21	87	3	-	-	-	-	-	-	110	-	-	1	2220	22	30	111
	97	29	65	7	-	-	-	-	-	-	101	-	-	-	2020	21	28	101
	00	41	28	16	-	-	-	-	-	-	85	-	-	-	1700	19	29	85
D	82	1	6	-	-	-	-	-	-	-	-	-	7	-	233			7
	88	14	29	10	-	-	-	-	-	-	49	-	4	-	1766			53
	95	4	15	2	-	-	1	-	-	-	17	1	-	4	440			22
	97	5	18	6	-	-	1	-	-	-	24	-	-	6	600			30
	00	22	18	9	-	2	-	-	-	-	33	-	-	18	1020			51
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	360			18
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'82	05%	00%	06%	+32%
'88	47%	14%	02%	-34%
'95	53%	03%	03%	-21%
'97	55%	09%	04%	+24%
'00	26%	13%	09%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'82	3966	Dec:	6%
	'88	5865		30%
	'95	3860		11%
	'97	3040		20%
	'00	3980		26%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex canescens																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	6	-	-	-	-	-	-	-	-	6	-	-	-	200			6
	95	5	1	-	-	-	-	-	-	-	6	-	-	-	120			6
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	82	12	-	-	-	-	-	-	-	-	12	-	-	-	400	27	21	12
	88	15	-	-	-	-	-	-	-	-	15	-	-	-	500	26	29	15
	95	9	9	6	1	2	-	-	-	-	27	-	-	-	540	26	33	27
	97	5	-	-	1	-	-	-	-	-	6	-	-	-	120	29	28	6
	00	14	3	-	3	1	-	-	-	-	21	-	-	-	420	31	35	21
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	4	1	-	-	-	-	-	-	-	5	-	-	-	100			5
	97	3	1	1	-	-	-	-	-	-	3	-	-	2	100			5
	00	7	3	1	-	3	-	-	-	-	14	-	-	-	280			14
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	80			4
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'82	00%	00%	00%	+43%
'88	00%	00%	00%	+ 8%
'95	34%	16%	00%	-68%
'97	08%	08%	17%	+66%
'00	29%	03%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'82	400	Dec:	0%
	'88	700		0%
	'95	760		13%
	'97	240		42%
	'00	700		40%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ceratoides lanata																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	82	22	-	-	-	-	-	-	-	-	22	-	-	-	733			22
	88	32	-	-	-	-	-	-	-	-	32	-	-	-	1066			32
	95	70	-	-	2	-	-	-	-	-	72	-	-	-	1440			72
	97	27	6	-	5	-	-	-	-	-	38	-	-	-	760			38
	00	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
M	82	82	-	-	-	-	-	-	-	-	82	-	-	-	2733	5	5	82
	88	53	-	-	-	-	-	-	-	-	53	-	-	-	1766	7	4	53
	95	396	34	3	2	-	-	3	-	-	438	-	-	-	8760	10	10	438
	97	178	154	-	11	-	-	-	-	-	343	-	-	-	6860	8	9	343
	00	109	128	61	-	-	7	-	-	-	305	-	-	-	6100	8	9	305
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	24	2	-	-	-	-	-	-	-	23	-	3	-	866			26
	95	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	5	22	7	1	1	-	-	-	-	34	-	-	2	720			36

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'82	00%	00%	00%	+ 6%
'88	02%	00%	03%	+64%
'95	07%	.58%	00%	-25%
'97	42%	00%	00%	- 8%
'00	43%	21%	.56%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'82	3466	Dec:	0%
	'88	3698		23%
	'95	10220		0%
	'97	7620		0%
	'00	7020		10%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	82	21	-	-	-	-	-	-	-	-	21	-	-	-	700			21
	88	152	-	-	-	-	-	-	-	-	152	-	-	-	5066			152
	95	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
Y	82	40	-	-	-	-	-	-	-	-	40	-	-	-	1333			40
	88	49	-	-	-	-	-	-	-	-	49	-	-	-	1633			49
	95	57	-	-	-	-	-	-	-	-	57	-	-	-	1140			57
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	30	-	-	-	-	-	-	-	-	30	-	-	-	600			30
M	82	50	-	-	-	-	-	-	-	-	50	-	-	-	1666	10	7	50
	88	148	1	1	1	-	-	-	-	-	151	-	-	-	5033	5	5	151
	95	96	-	-	4	-	-	-	-	-	100	-	-	-	2000	9	9	100
	97	82	-	-	-	-	-	-	-	-	82	-	-	-	1640	7	7	82
	00	114	-	-	-	-	-	-	-	-	114	-	-	-	2280	5	7	114
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	95	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	97	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	00	7	-	-	-	-	-	-	-	-	5	-	-	2	140			7
X	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'82	00%	00%	00%	+56%
'88	.49%	.49%	00%	-53%
'95	00%	00%	00%	-46%
'97	00%	00%	01%	+42%
'00	00%	00%	01%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
'82	2999		0%
'88	6766		1%
'95	3200		2%
'97	1740		1%
'00	3020		5%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	82	7	-	-	-	-	-	-	-	-	7	-	-	-	233	3	4	7
	88	3	-	-	-	-	-	-	-	-	3	-	-	-	100	4	9	3
	95	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	12	4
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	2	-	-	-	1	-	-	-	-	3	-	-	-	60	4	11	3
D	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'82	00%	00%	00%	+12%
'88	00%	00%	00%	-70%
'95	00%	00%	00%	
'97	00%	00%	00%	
'00	20%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'82	233	Dec:	0%
	'88	266		0%
	'95	80		0%
	'97	0		0%
	'00	100		20%

Pinus edulis																		
S	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	82	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	88	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	95	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'82	00%	00%	00%	
'88	00%	00%	00%	
'95	00%	00%	00%	
'97	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'82	0	Dec:	-
	'88	33		-
	'95	0		-
	'97	0		-
	'00	0		-